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**Protocol Stack** Socket Application Network Interface Server Kernel Level User Level Internet FIG. 1A (Prior Art) Protocol Stack Socket Application Network Interface

Kernel

User Level 29820.8 1 of 28



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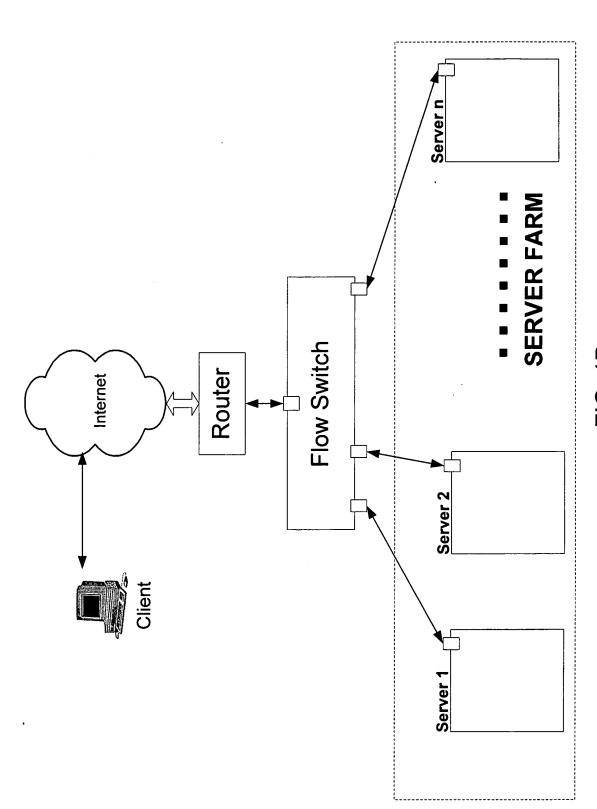


FIG. 1B (Prior Art)



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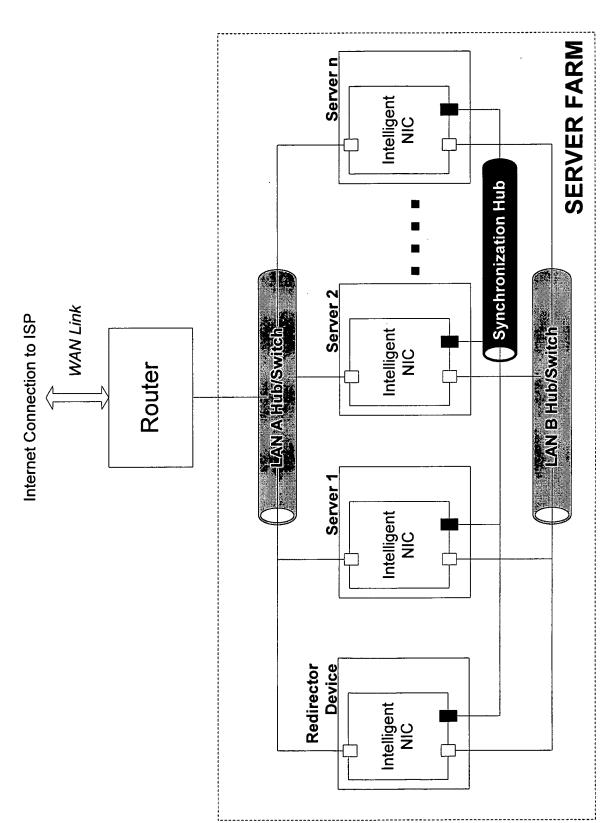


FIG. 2A

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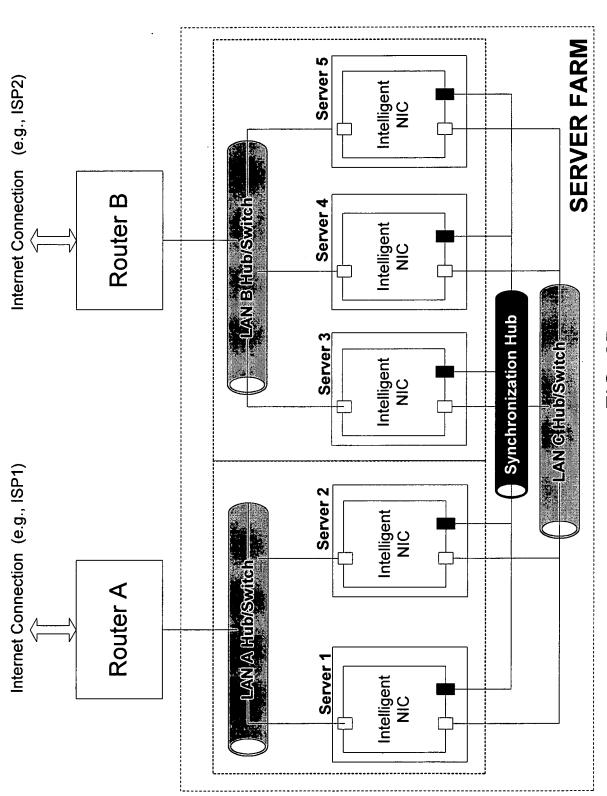
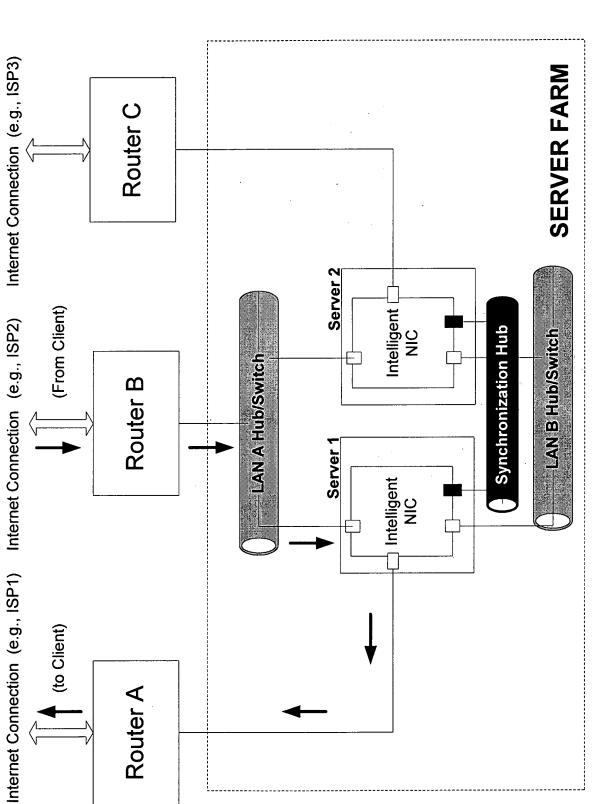


FIG. 2B



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FIG. 2C



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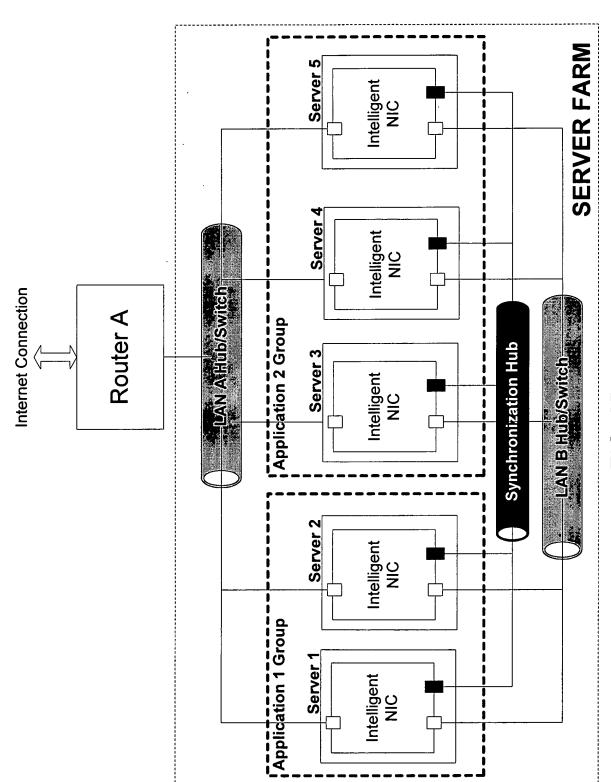


FIG. 21

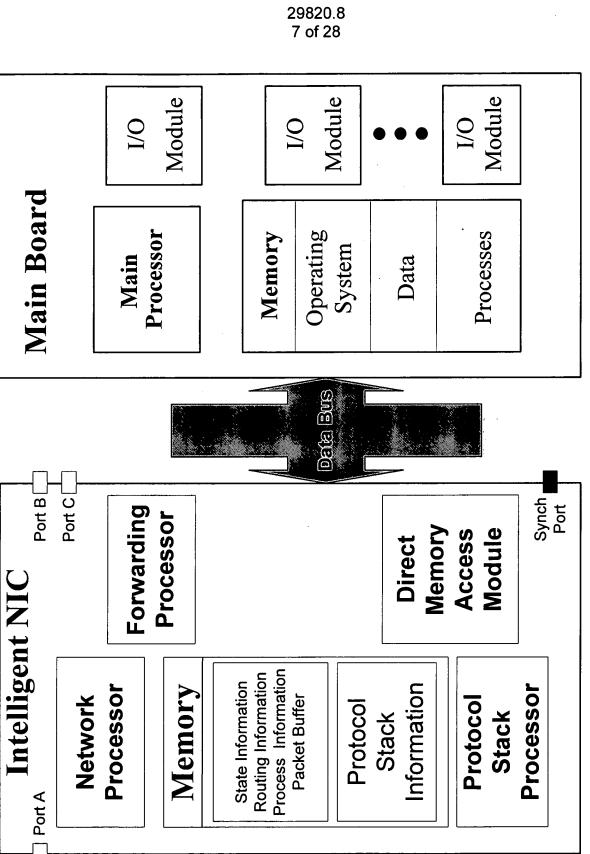


FIG. 3

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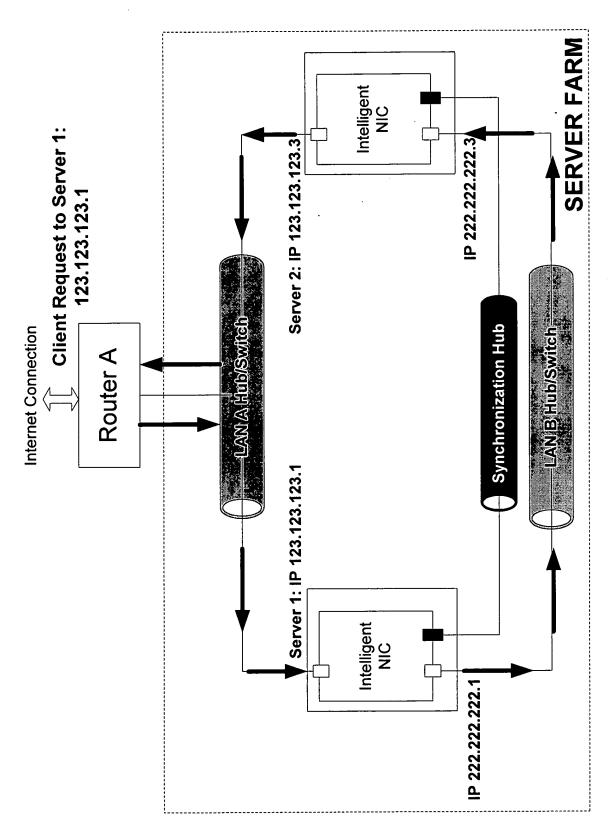


FIG. 44

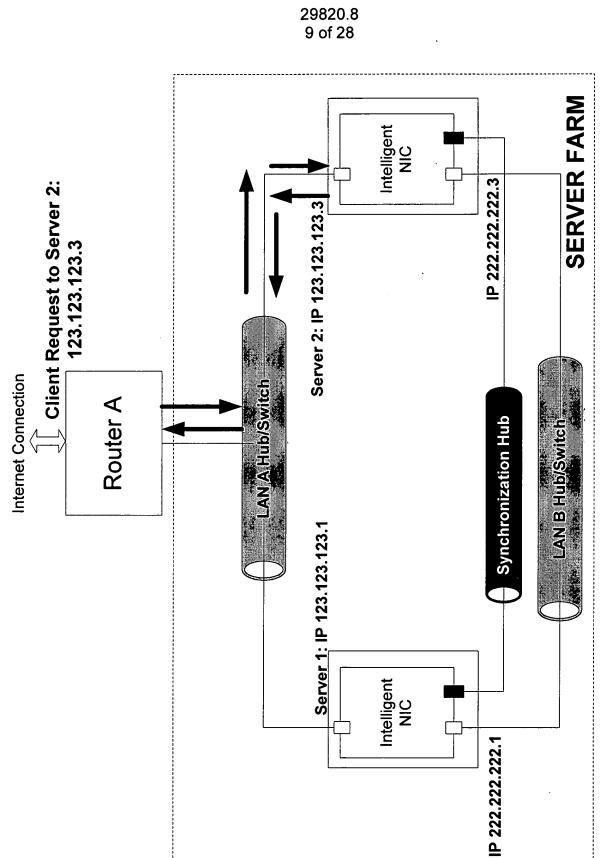
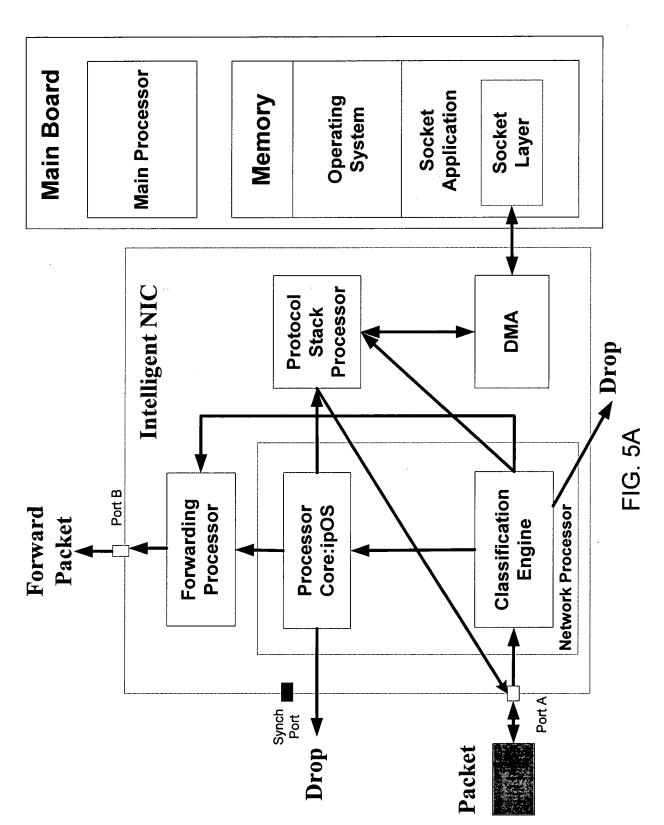
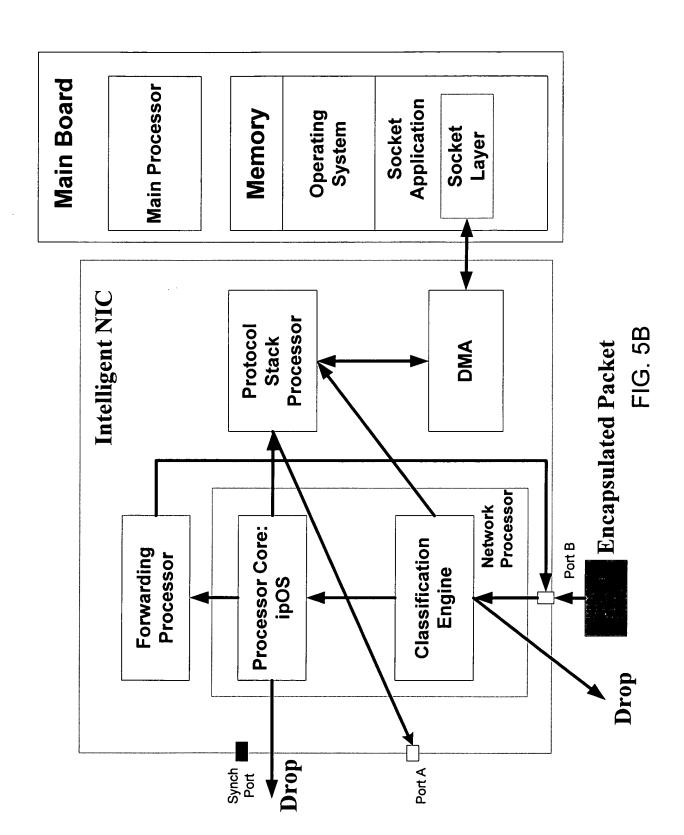


FIG. 4

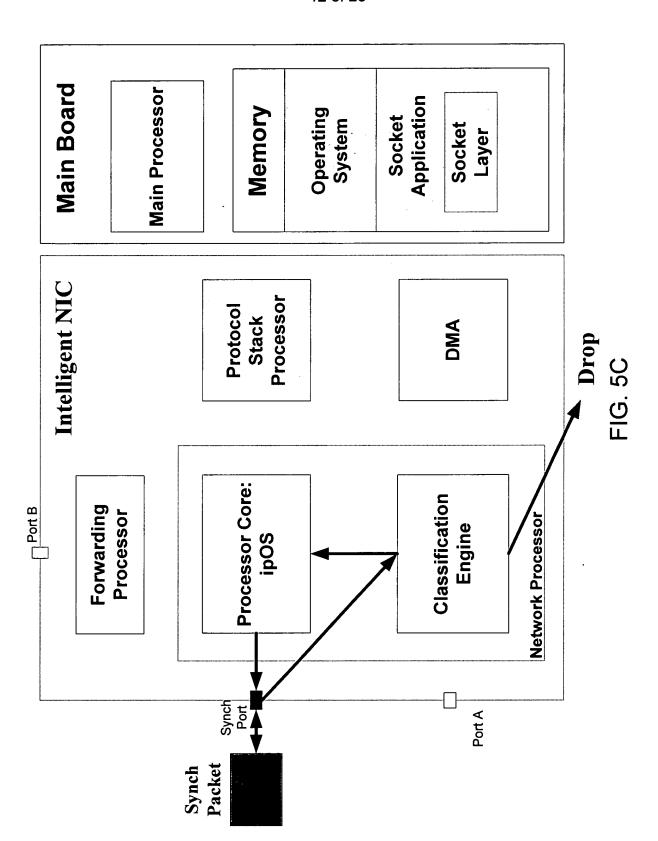
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FIG. 6

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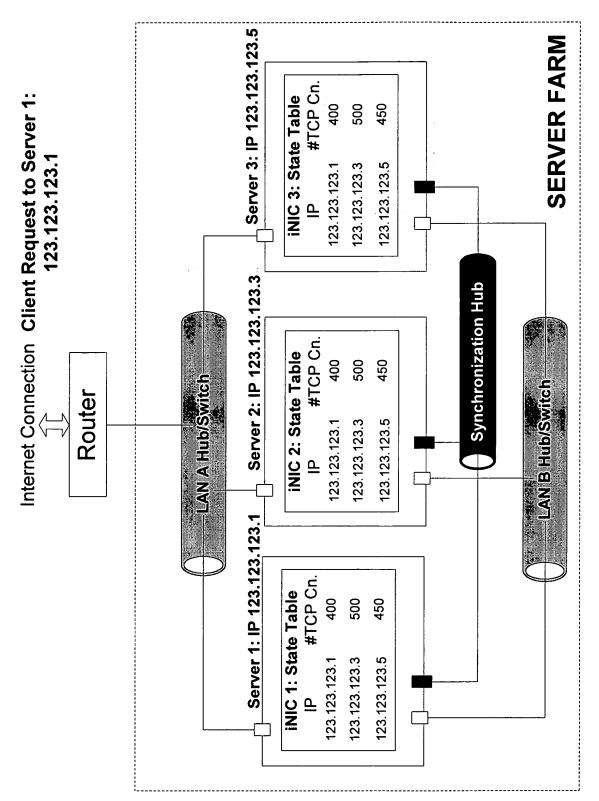


FIG. 7

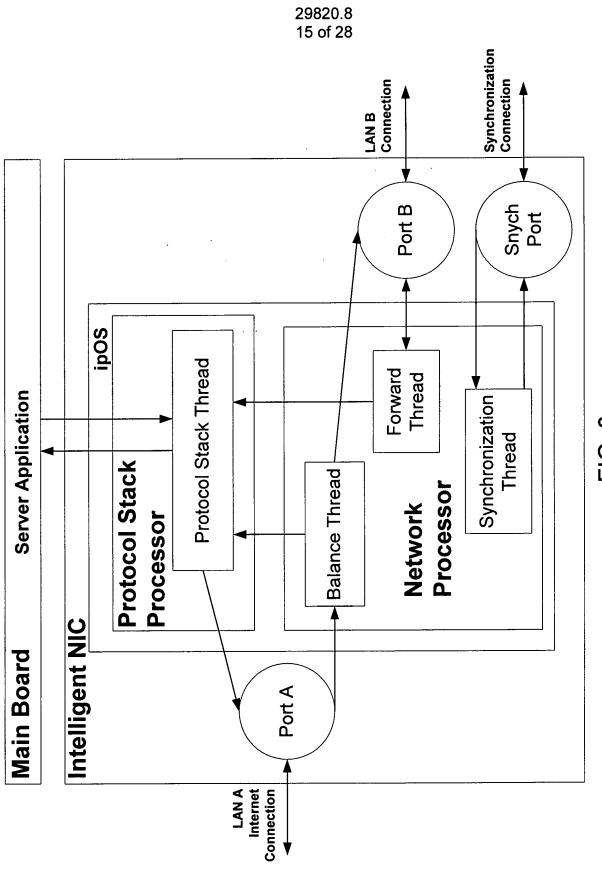
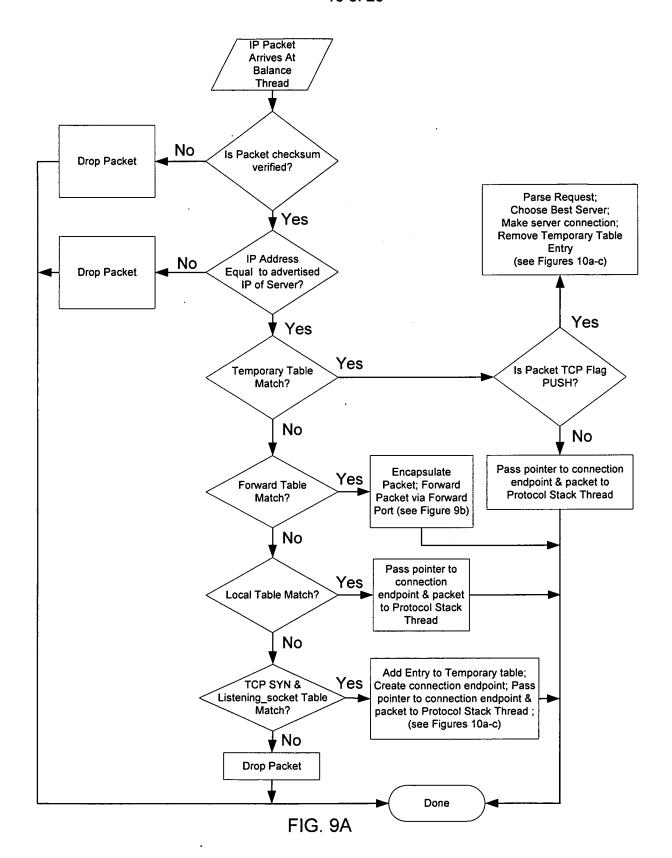


FIG. 8

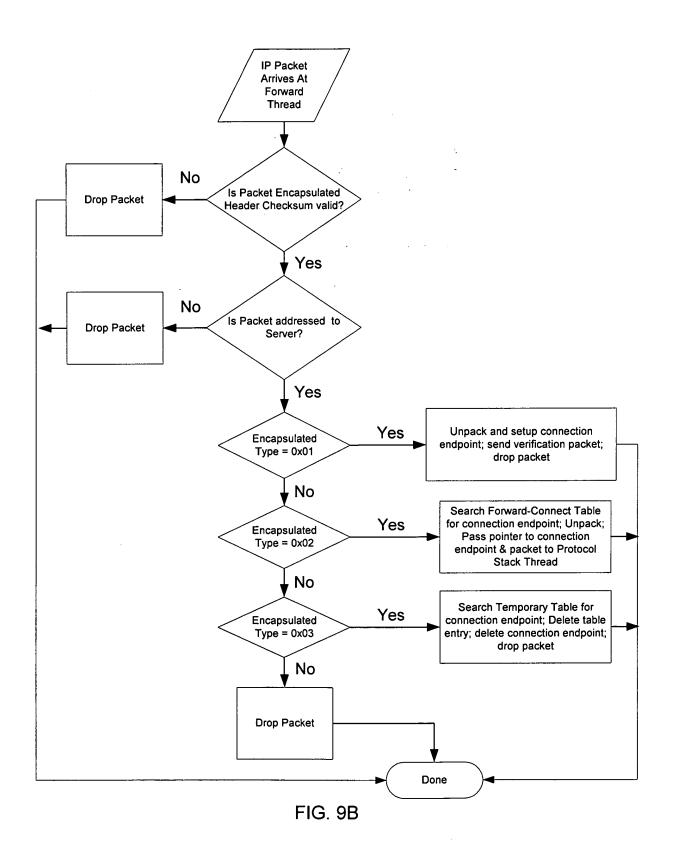




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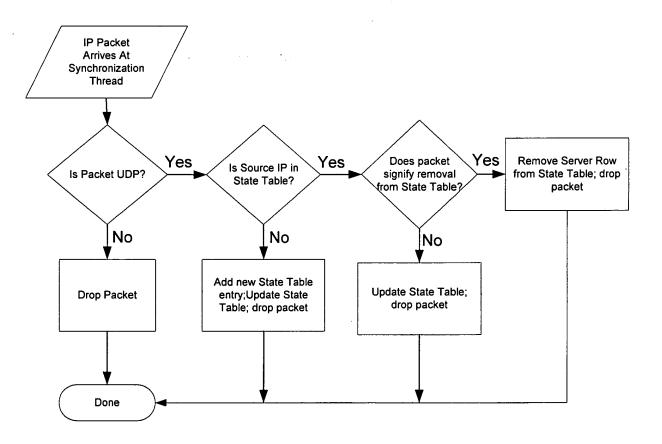
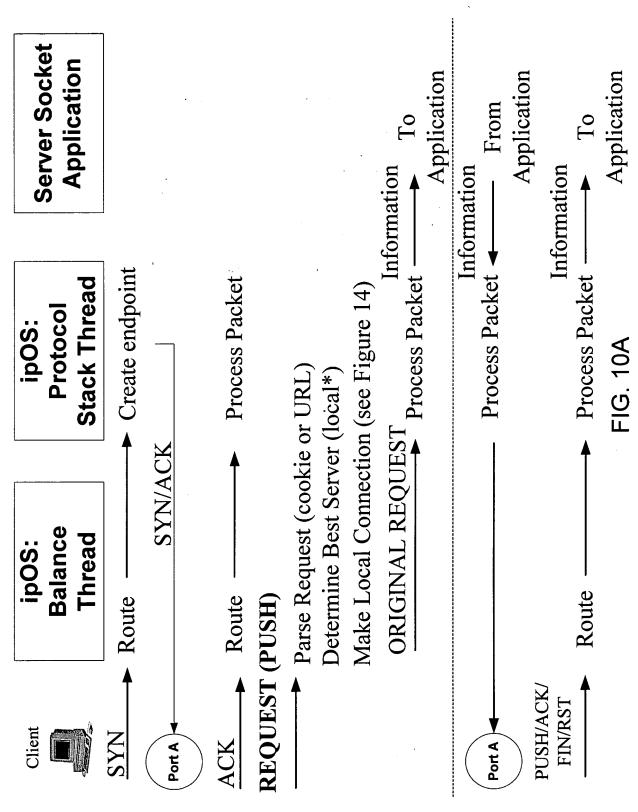
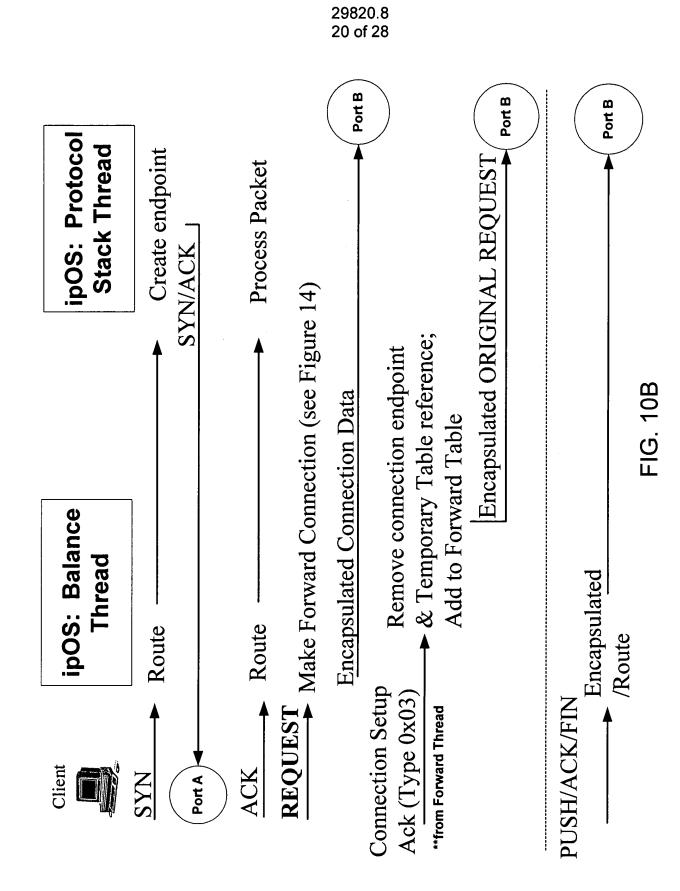


FIG. 9C

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**Server Socket** 

ipOS: Protocol Stack Thread

ipOS: Forward

**Thread** 

**Application** 

29820.8 21 of 28 Application Application From Information Information Process Packet – Create endpoint **Process Packet** PUSH/ACK/FIN Information Unpack ——— Connection Setup Acknowledgement (Type Encapsulated Connection Unpack – 0x03PUSH/ACK/FIN Encapsulated Information Encapsulated Connection

Port B

Port B

Port B

Port A

FIG. 10C



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#### **Ethernet Encapsulation Header**

MAC Destination Address	MAC Source Address	Type 0x007	FIG. 11A
6	6	2	(Prior Art)

### ipOS Encapsulation Header

Source IP	Source Port	Dest. IP	Dest. Port	Туре	Protocol	Checksum	FIG. 11B
Δ	2	4	2	1	1	2	

## ipOS Connection Information (UDP)

Server IP	Server Port			FIG. 1
Λ	2.			

## ipOS Connection Information (TCP)

Server IP	Server Port	TCP Control Block Information	FIG. 11D
1	2	140	

## ipOS TCP Connection Packet (Type=0x01; Protocol=0x01)

Ethernet Encap. Type =0x007	ipOS Encap. Header	TCP ipOS Connection Information	FIG. 11E
14	16	146	

## ipOS UDP Connection Packet (Type=0x01; Protocol=0x02)

Ethernet Encap. Type =0x007	ipOS Encap. Header	UDP ipOS Connection Information	FIG. 11F
14	16	6	

## ipOS TCP Packet (Type=0x02; Protocol=0x01)

Ethernet Encap. Type =0x007	ipOS Encap. Header	IP/TCP Packet	FIG. 11G
14	16	40 + Data	

## ipOS UDP Packet (Type=0x02; Protocol=0x02)

Ethernet Encap. Type =0x007	ipOS Encap. Header	IP/UDP Packet	FIG. 11H
14	16	28 + Data	

## ipOS Endpoint Migration Acknowledgement Packet (Type=0x03)

Ethernet Encap. Type =0x007	ipOS Encap. Header
14	16





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**Forward Table** 

Key	Field	Description
Yes	Source IP Address	IP address of Client
Yes	Source TCP Port	TCP Port of Client
No	Destination IP Address	IP Address to Forward
No	Destination TCP Port	TCP Port to Forward

Local/Forward-Connect/Temporary Table

KEY	Field	Description
Yes	Source IP Address	Client IP address
Yes	Source Port	Client TCP Port
Yes	Destination IP Address	Endpoint IP Address
Yes	Destination Port	Endpoint TCP Port
No	Endpoint Reference	Reference to Connection Endpoint

#### **Server State Table**

Key	Field	Description
Yes	Server IP Address	Server
No	Number TCP Connections	TCP Established Connections
No	CPU utilization	Main board CPU utilization
No	Available memory	Unused memory on Main Board
No	Available Bandwidth	Unused Bandwidth Capacity

## **Listening Sockets Table**

Key	Field	Description
Yes	Server IP Address	Server
Yes	TCP Port	Advertised TCP Port
No	Process	Application process advertising IP/Port

**Application Information Table** 

Key	Field	Description
Yes	Process ID	Application identification
No	Process memory requirements	Memory required to run application
No	Process CPU Utilization	Measure of application CPU utilization

**URL Map Table** 

Key	Field	Description
Yes	URL	Universal Resource Locator
Yes	Server IP Address	IP address of associated server

## Cookie Map Table

Key	Field	Description
Yes	Cookie ID	Cookie Identification tag
No	Server IP Address	IP address of associated server

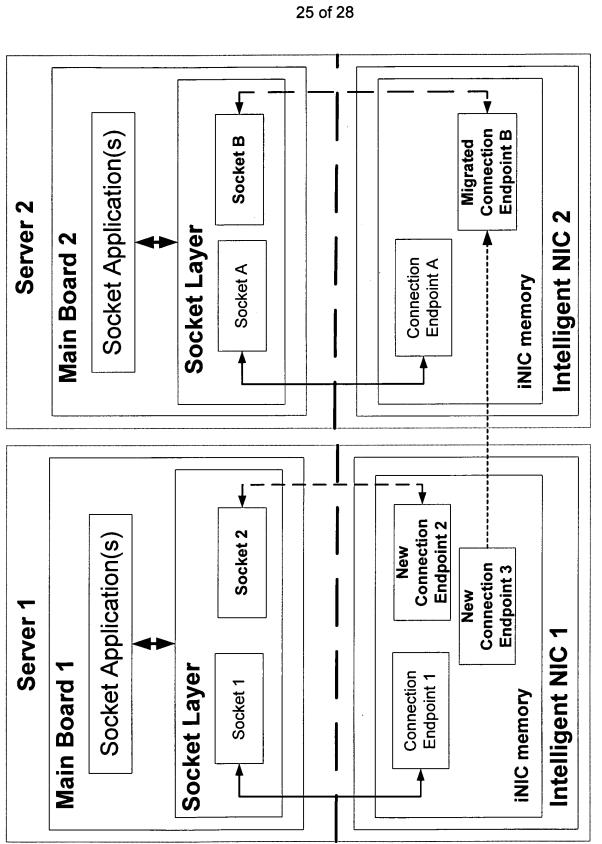




Information **Protocol Stack Processor** Protocol Stack Thread Socket Application Connection Endpoint **Socket Layer** Main Board RAM Socket Reference Connection Endpoint Reference INIC RAM Intelligent NIC Socket

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FIG. 13



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FIG. 14



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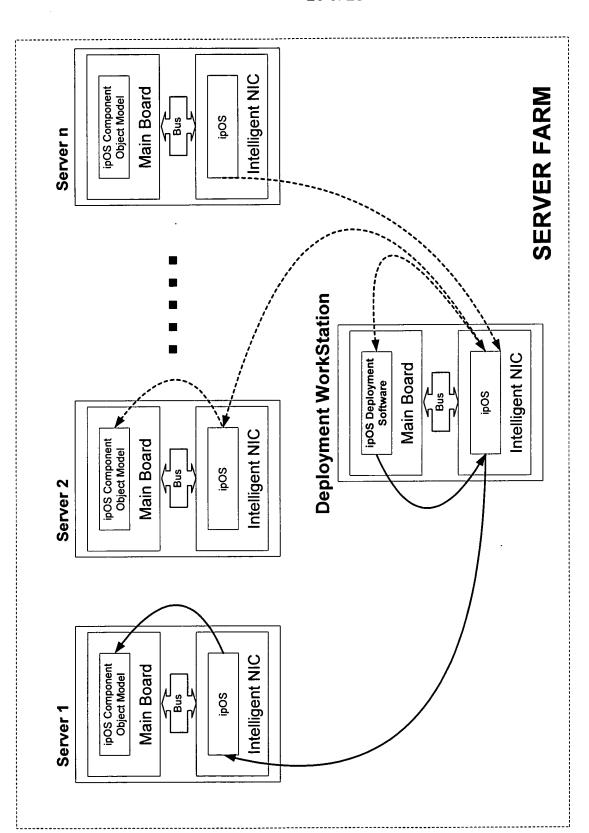


FIG. 15





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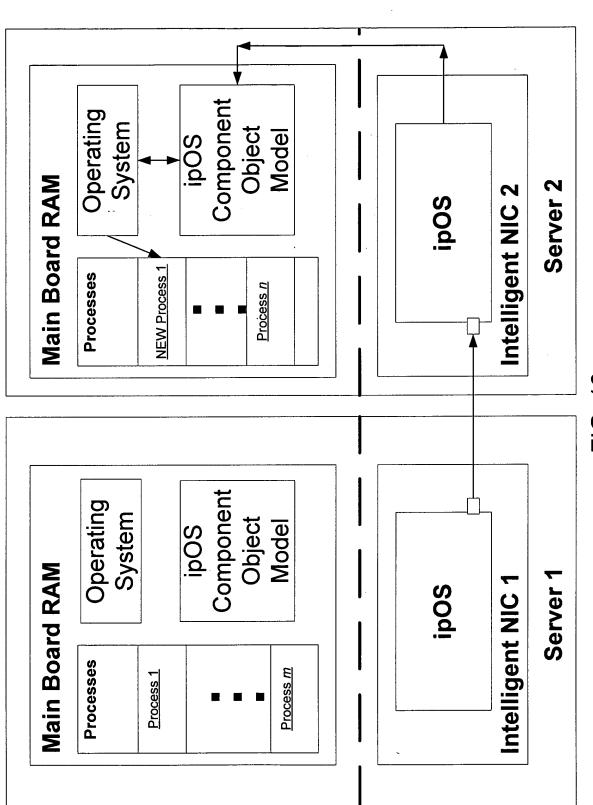


FIG. 16





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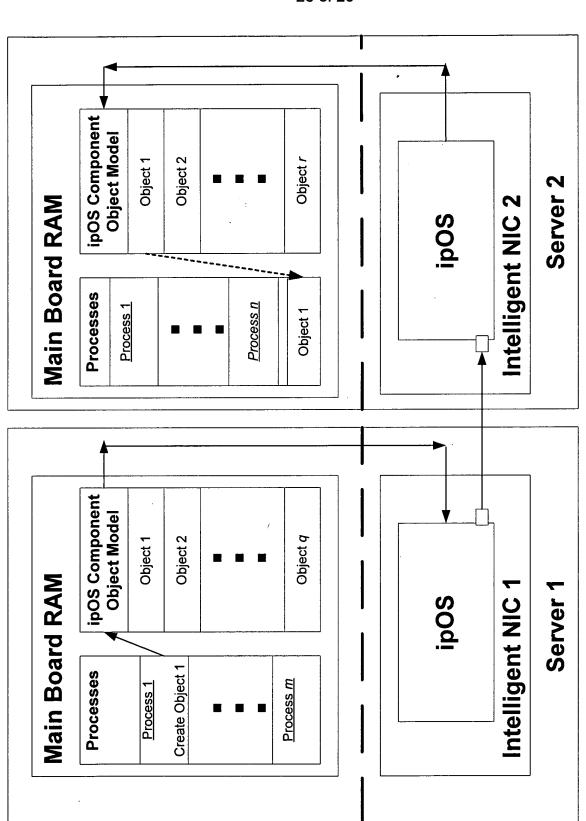


FIG. 17